

**THE UNITED STATES COURT  
FOR THE WESTERN DISTRICT OF PENNSYLVANIA**

<b>N.A. WATER SYSTEMS, LLC</b>	)	
	)	
<b>Plaintiff,</b>	)	<b>Civil Action No.</b>
	)	
<b>v.</b>	)	<b>Judge</b>
	)	
<b>AQUATECH INTERNATIONAL CORPORATION &amp; DEBASISH MUKHOPADHYAY,</b>	)	
	)	
<b>Defendant.</b>	)	

**COMPLAINT**

N.A. Water Systems, LLC (“NAWS”) brings this action for patent infringement, and for declaratory judgment relating to NAWS’ OPUS system and process for treating wastewater.

**PARTIES**

1. NAWS is a Pennsylvania limited liability company and a direct subsidiary of Veolia Water Solutions & Technologies North America, Inc. and has its principal place of business in Allegheny County, Pennsylvania.
2. Aquatech is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, and has its principal place of business in Washington County, Pennsylvania.
3. Upon information and belief, Debasish Mukhopadhyay resides in the State of California.

### **JURISDICTION AND VENUE**

4. This action arises under the patent laws of the United States, 35 U.S.C. §§1 et. seq.

5. This Court has subject matter jurisdiction under the provisions of 28 U.S.C. §§1331 and 1338(a).

6. Venue is proper in this Judicial District pursuant to 28 U.S.C. §§1391(b), 1391(c), and 1400(b) because Aquatech and Mukhopadhyay have regularly conducted business in this judicial district and are subject to personal jurisdiction in this judicial district.

7. This Court can enter the declaratory relief sought in this Complaint because this case presents an actual case and controversy, and is within the Court's jurisdiction pursuant to the provisions of the Federal Declaratory Judiciary Act, 28 U.S.C. §2201.

### **NATURE OF THIS ACTION**

8. NAWS is an exclusive licensee of U.S. Patent No. 5,250,185 ("the '185 patent") (Exhibit A).

9. Mukhopadhyay is the owner of U.S. Patent Nos. 5,925,255 (the "'255 patent") and 6,537,456 (the "'456 patent") (collectively, the "HERO patents").

10. On information and belief Mukhopadhyay granted Aquatech a license to market and sell reverse osmosis ("RO") processes for treating feedwater utilizing methods covered by the HERO patents.

11. In this action, NAWS asserts that Aquatech and Mukhopadhyay have and continue to infringe the '185 patent.

12. In addition, NAWS seeks a declaration that NAWS' process known as OPUS (described in detail below) does not infringe the HERO Patents and that any actions by

NAWS relating to promoting the OPUS process do not contribute to, or induce infringement of, the HERO patents.

13. NAWS further seeks a declaration that the HERO patents are invalid and unenforceable.

### **HIGH Ph REVERSE OSMOSIS PROCESSES AND THE '185 PATENT**

14. Reverse osmosis (RO) membranes are widely used in the field of water treatment for the removal of total dissolved solids from a feedwater. RO membranes are often used, for example, to produce high purity water for drinking and irrigation from seawater and brackish water. RO membranes are also used in the treatment of wastewater produced in oil recovery processes.

15. Treatment of a feedwater with an RO membrane is similar to filtration, but relies on diffusion rather than particle size to achieve separation of solids from the feedwater. A feedwater is forced under pressure through the RO membrane. Solutes contained in the water are retained and concentrated to form a retentate or reject stream, while the treated water passes through the membrane to form a permeate or product stream.

16. Membrane fouling and scaling are common problems in water treatment systems using an RO membrane. In the course of purifying a feedwater stream with a membrane, it is common for solids to become deposited on the membrane. This causes a reduction in product flow through the membrane, increases the frequency of cleaning, and reduces the life of the membrane.

17. To reduce fouling and scaling of the membrane, typical processes employ various pre-treatment processes to remove impurities in the feedwater that contribute to fouling and scaling. Typically, impurities found in feedwater streams are hardness (calcium and

magnesium), silica, suspended solids, organics, and boron. Hardness in the form of calcium carbonate ( $\text{CaCO}_3$ ), for example, is a common cause of scaling.

18. The solubility of calcium carbonate decreases with increasing pH. When the pH is raised, calcium carbonate precipitates from the feedwater and forms a scale on the RO membrane. For this reason, in the past it was common practice to pre-treat the feedwater to remove hardness before feeding to the RO membrane, and to operate the RO membrane at a pH below 7.0 to avoid precipitation. In addition, anti-scalants can be added to the feedwater to help prevent precipitation of calcium carbonate.

19. In the early 1990's a researcher named Fansheng T. Tao designed a process now known as a high pH RO process which is effective in removing these impurities from feedwater streams. Tao's process employed RO membranes and various systems for pre-treating the feedwater ahead of the RO membranes.

20. In his high pH RO process, Tao included a warm lime softener, filters, and a weak acid cation (WAC) ion exchange ahead of the RO membranes. These pre-treatment systems removed hardness, silica, and suspended solids from the feedwater before the feedwater reached the RO membranes.

21. Tao also discovered that it was important to raise the pH of the feedwater ahead of the RO membranes in order to reduce membrane fouling and scaling. Tao raised the pH of the feedwater to about 10.5 and higher. Tao discovered that by raising the pH, impurities such as organics, boron, and other dissolved solids assumed a soluble state in the feedwater. In a soluble state, these impurities do not precipitate, form deposits on the membrane, or cause fouling or scaling of the membrane. By raising the pH and maintaining

impurities soluble, the RO membrane is effective to reject these impurities. Furthermore, by raising the pH, the Tao process inherently removed carbon dioxide from the feedwater stream.

22. The Tao process is protected by U.S. Patent No. 5,250,185 (“the ‘185 patent”). *See* Ex. A.

23. NAWS is an exclusive licensee of the ‘185 patent.

**DEFENDANT MUKHOPADHYAY’S HERO PATENTS**

24. Defendant Mukhopadhyay knew Tao, knew of Tao’s process, and knew that Tao had employed a high pH RO process to remove hardness, silica, organics, boron, and other impurities from feedwater.

25. Upon information and belief, Defendant Mukhopadhyay also had access to extensive data and studies concerning Tao’s high pH RO process and Tao’s pilot testing of that process.

26. Upon information and belief, in the mid-1990’s, after Tao had developed his high pH RO process, Defendant Mukhopadhyay started experimenting with a high pH RO process very similar to Tao’s high pH RO process. As a result, Mukhopadhyay filed a number of patent applications directed at a high pH RO process. These patent applications matured into U.S. Patent Nos. 5,925,255 (the “‘255 patent”) and 6,537,456 (the “‘456 patent”), (collectively the “HERO patents”). *See* Exs. B and C.

27. The HERO process is very similar to the process protected by the ‘185 patent (the “Tao process”). Both processes operate the RO membranes at a relatively high pH to reject organics, boron, and other dissolved solids, and both processes pre-treat the feedwater to remove hardness and reduce membrane scaling.

28. In addition, both the Tao process and the HERO process remove carbon dioxide from the feedwater. In the Tao process, the act of raising the pH of the feedwater converts the carbon dioxide in the feedwater into bicarbonates. In the HERO process, carbon dioxide is removed using a degasifier before raising the pH of the feedwater.

### **NAWS' OPUS PROCESS**

29. NAWS's OPUS process is a variant and an improvement of the Tao process. In the OPUS process, the feedwater stream is treated to remove hardness using the same basic techniques first described by Tao. Like the Tao process, the OPUS process uses warm lime softening to precipitate hardness, followed by removing residual hardness in a WAC ion exchange. In OPUS, there is no pH adjustment following hardness removal because the pH is raised during warm lime softening and is maintained during subsequent treatment steps.

30. Exhibit D to this Complaint is a schematic illustrating the basic OPUS process. As illustrated, the pre-treatment portion of the process includes chemical softening, filtration in the form of both media and cartridge filtration, and WAC ion exchange softening. Downstream from the chemical softening is an RO unit which includes membranes.

31. Chemical softening is performed in what is referred to as the "MULTIFLO" chemical softener, which includes a series of mixing tanks and a clarifier. The function of the MULTIFLO chemical softener is twofold: 1) to remove some hardness and suspended solids from the feedwater, and 2) raise the pH of the feedwater. This is typically accomplished by mixing one or more alkaline reagents with the feedwater in one or more of the mixing tanks of the MULTIFLO unit. This causes various hardness species to precipitate and, because the reagent is an alkaline, the pH of the feedwater is raised.

32. After adding the alkaline reagent, precipitating hardness species and raising the pH, the feedwater is directed to the clarifier where the precipitated hardness species and suspended solids settle and form a sludge. Some of the sludge is recycled to one or more of the mixing tanks of the MULTIFLO unit, while another portion of the sludge is wasted, resulting in the removal of the hardness species and suspended solids.

33. Effluent from the clarifier is directed to the multimedia filter for further removal of suspended solids. Downstream of the multimedia filter is one or more WAC ion exchange units. The ion exchange units further reduce the concentration of hardness species in the feedwater.

34. Finally, the feedwater is directed through cartridge filters that further remove suspended solids. Effluent from the cartridge filters is directed to the RO unit that removes dissolved solids, organics, and boron from the feedwater stream.

#### **AQUATECH'S CLAIMS REGARDING THE HERO PATENTS**

35. On November 13, 2009 NAWS presented a proposal to Kiewit Power Engineers ("Kiewit") and its client, Idaho Power Company ("Idaho Power"), to provide NAWS' OPUS system and process for treating a cooling tower blowdown stream at one of Idaho Power's plants.

36. The OPUS process proposed to Kiewit and Idaho Power is substantially the same process discussed above and shown in Exhibit D. *See* Ex. E (schematic of the OPUS process proposed to Kiewit and Idaho Power).

37. Aquatech also presented a proposal to Kiewit and Idaho Power. On information and belief, Aquatech proposed to Kiewit a process that Aquatech claims is covered by the HERO patents.

38. Between mid-November and mid-December 2009, NAWS and Kiewit had numerous discussions concerning the OPUS system and process, how it worked, and the results that Idaho Power could expect if it implemented the OPUS process.

39. In early December 2009, Kiewit raised for the first time with NAWS concerns that the OPUS process might subject Kiewit and Idaho Power to exposure for patent infringement. Kiewit and Idaho Power sought assurances that the OPUS process did not infringe any patents and asked whether NAWS would indemnify Idaho Power against patent infringement.

40. NAWS assured Kiewit and Idaho Power that the use of NAWS' OPUS process would not infringe any patents and further agreed to indemnify Kiewit and Idaho Power against patent infringement claims.

41. Kiewit advised NAWS that it had received a letter from Aquatech and/or defendant Mukhopadhyay stating that if Idaho Power utilized NAWS' OPUS process, Idaho Power would be liable for infringing the HERO patents and that Idaho Power could be enjoined from using the OPUS process.

42. In mid-December 2009, Kiewit notified NAWS that it had awarded the contract to Aquatech.

43. On information and belief, Idaho Power directed Kiewit not to award the contract to NAWS as a consequence of the threat of patent litigation by Aquatech and/or defendant Mukhopadhyay.

44. Kiewit advised NAWS that Idaho power was a regulated power company with large power supply contracts and could not afford the consequential damages risks associated with the threat of being enjoined from using the OPUS process.



45. On information and belief, Aquatech and/or defendant Mukhopadhyay advised Kiewit and/or Idaho Power that the OPUS process violates the HERO patents.

46. NAWS seeks a declaration confirming its continued right to promote, market, and sell the OPUS process in the power industry as well as all other industries.

47. An actual case and controversy exists because Aquatech and/or Mukhopadhyay have asserted the HERO patents to intimidate Kiewit and Idaho Power not to contract with NAWS, and have generally infected the competitive environment surrounding the Idaho Power project and other similar projects.

48. Moreover, other projects similar to the Idaho Power Project are forthcoming and, unless deterred by the Court, a substantial risk exists that Aquatech and/or Debasish Mukhopadhyay will again wrongfully assert the HERO patents against potential customers in an attempt to intimidate prospective customers into rejecting NAWS' OPUS process in favor of Aquatech's HERO process.

49. Aquatech and Mukhopadhyay have harmed and will continue to harm NAWS' economic interests by impairing its ability to promote, market, and sell its OPUS process.

**COUNT I – PATENT INFRINGEMENT**  
**35 U.S.C. §271**

50. NAWS realleges and incorporates by the preceding paragraphs of the Complaint.

51. NAWS is the exclusive licensee of the '185 patent.

52. Aquatech and Mukhopadhyay have infringed and continue to infringe the '185 patent. Aquatech and Mukhopadhyay are liable for indirect infringement by way of inducement or contributory infringement as provided for in 35 U.S.C. §271.

53. Aquatech and Mukhopadhyay contribute to the infringement of the '185 patent in violation of 35 U.S.C. §271 by selling and offering for sale in the United States equipment to others that is designed to carry out processes that infringe the '185 patent.

54. Aquatech and Mukhopadhyay have induced and continue to induce others to infringe the '185 patent in violation of 35 U.S.C. §271 by encouraging and facilitating others to practice water treatment processes known by Aquatech and Mukhopadhyay to constitute acts of infringement of the '185 patent.

55. Aquatech's and Mukhopadhyay's acts of infringement have caused damage to NAWS, and NAWS is entitled to recover from Aquatech and Mukhopadhyay the damages sustained by it as a result of the wrongful acts of Aquatech and Mukhopadhyay in an amount subject to proof at trial. Aquatech's and Mukhopadhyay's infringement of NAWS' rights under the '185 patent is willful and will continue to damage NAWS' business, causing irreparable harm unless enjoined by the Court.

56. This is an exceptional case and NAWS is entitled to an award of attorneys' fees pursuant to 35 U.S.C. §285.

**COUNT II -- DECLARATORY JUDGMENT OF NON-INFRINGEMENT  
28 U.S.C. §§2201, 2202; 35 U.S.C. §271**

57. NAWS realleges and incorporates by reference the preceding paragraphs of the Complaint.

58. The OPUS process does not infringe the '255 patent or the '456 patent, and NAWS has not contributed to or induced infringement of the '255 patent or the '456 patent.

59. This is an actual controversy, within the meaning of 28 U.S.C. §§2201 and 2202, between NAWS and Aquatech and Mukhopadhyay concerning the infringement of the ‘255 and ‘456 patents.

60. NAWS is entitled to a declaratory judgment that its OPUS process does not infringe any valid claim of the ‘255 patent or the ‘456 patent, either literally or under the doctrine of equivalents, and that NAWS, by promoting the OPUS process and selling equipment to practice the OPUS process, does not indirectly infringe the ‘255 and ‘456 patents.

61. This is an exceptional case, and NAWS is entitled to an award of attorneys’ fees pursuant to 35 U.S.C. §285.

**COUNT III -- DECLARATORY JUDGMENT OF PATENT INVALIDITY  
28 U.S.C. §2201, 2202, 35 U.S.C. §§102, 103, and 112**

62. NAWS realleges and incorporates by reference the preceding paragraphs of the Complaint.

63. Based on the prosecution histories of the ‘255 patent and the ‘456 patent, and the prior art cited during prosecution, as well as other prior art, the patent claims in the ‘255 patent and ‘456 patent are invalid.

64. The ‘255 patent and each of the claims therein are invalid for failure to comply with one or more of the requirements of 35 U.S.C. §§102, 103, and 112.

65. The ‘456 patent and each of the claims therein are invalid for failure to comply with one or more of the requirements of 35 U.S.C. §§102, 103, and 112.

66. This is an actual controversy, within the meaning of 28 U.S.C. §§2201 and 2202, between NAWS and Aquatech and Mukhopadhyay as to whether there exists any valid and enforceable claims of the ‘255 patent and the ‘456 patent.

67. NAWS is entitled to a declaratory judgment that all claims in the '255 patent and the '456 patent are invalid.

68. This is an exceptional case, and NAWS is entitled to an award of attorneys' fees pursuant to 35 U.S.C. §285.

### **PRAYER FOR RELIEF**

WHEREFORE, NAWS prays for the following relief:

1. A judgment that Aquatech and Mukhopadhyay have infringed U.S. Patent No. 5,250,185;
2. A permanent injunction restraining and enjoining Aquatech and Mukhopadhyay and their respective officers, agents, servants, employees, attorneys, and other persons in active concert or participation with them from contributing to or inducing the infringement of U.S. Patent No. 5,250,185;
3. Damages to compensate NAWS for Aquatech's and Mukhopadhyay's infringement of U.S. Patent No. 5,250,185 pursuant to 35 U.S.C. §284;
4. Enhanced damages pursuant to 35 U.S.C. §284;
5. An award of pre-judgment and post-judgment interest and costs to NAWS in accordance with 35 U.S.C. §284;
6. An award of NAWS' reasonable attorneys' fees pursuant to 35 U.S.C. §285;
7. A declaration that the OPUS process does not infringe the '255 and '456 patents;

8. A declaration that the actions of NAWS in promoting the OPUS process and selling equipment to others for the purpose of practicing the OPUS process does not constitute contributory infringement or inducement to infringe the '255 and '456 patents;

9. A declaration that each of the claims of the '255 and '456 patents is invalid and unenforceable; and

10. Such other and further relief as this Court deems just and proper.

### **DEMAND FOR JURY TRIAL**

NAWS respectfully demands a trial by jury on all claims and issues so triable.

Dated: April 14, 2010

By: Andrew K. Fletcher

Andrew K. Fletcher (PA ID No. 75544)  
Jessica Beckett-McWalter (PA ID No. 207140)  
Amber Schuknecht Martin (PA ID No. 202927)  
PEPPER HAMILTON LLP  
One Mellon Center  
500 Grant Street, 50th Floor  
Pittsburgh, PA 15219  
Telephone: (412) 454-5000  
Facsimile: (412) 281-0717

*Of Counsel:*

Larry L. Coats, Esquire  
David Bennett, Esquire  
Anthony Biller, Esquire  
COATS & BENNETT PLLC  
1400 Crescent Green, Suite 300  
Cary, NC 27518  
Telephone: (919) 854-1844  
Facsimile: (919) 854-2084

*Counsel for Plaintiff, N.A. Water Systems, LLC*